



# **The AFIP — 2006**

**A Unique Central Institution for Excellence**



**Armed Forces Institute of Pathology  
Washington, DC**



## The Director

**Renata B. Greenspan, COL, MC, USA**

Appointed 36th AFIP Director on May 22, 2003, she became the first woman to hold the position in the triservice institution. COL Greenspan oversees operations and management of the historic and unique center for second-opinion consultations, education, and research in pathology and related specialties in support of military, federal, and civilian medicine worldwide.

She is the Director of Health Affairs' chartered Joint Laboratory Working Group, tasked with a responsibility to standardize and consolidate Department of Defense laboratory operations aiming for maximum efficiency of services.

## Principal Deputy Director

**Florabel G. Mullick, MD, ScD, FCAP, SES**

Serves as principal advisor and executive agent of the director for overall direction, administration, policy, business practices, operation and management of the organization in executing all of its assigned missions. Dr. Mullick is a physician executive responsible for directing the activities of five service line Directorates, each consisting of a series of interrelated elements and functions that support military and civilian medicine through the Institute's consultative role. She chairs the Principal Deputy Director's council that provides fiscal management for an operating budget of over \$100 million, including reimbursables and extramural research grants.

Dr. Mullick is credentialed in environmental pathology and also serves as Chair, Department of Environmental and Infectious Disease Sciences. She is world-recognized as an expert in adverse drug reactions.



## Deputy Director, Air Force

**Director, Field Operations**

**Charles W. Pemble, III, Col, USAF, DC**

The Directorate of Field Operations provides coordination for operational readiness planning, mobilization, and training as well as ensuring maximum medicolegal and forensic science support to DoD operations in medico-legal investigations and mortality surveillance. The Directorate also ensures regulatory compliance in the use, storage, and transfer of biological select agents and toxins used in research projects. The comprehensive biological surety program combines elements of physical security, safety, and personnel reliability.

Col Pemble served as the Air Force Surgeon General's consultant in Forensic Dentistry and as Chair of the Oral and Maxillofacial Pathology Department before becoming Deputy Director. He is AFIP's representative and spokesman for Base Realignment and Closure activities.

## Associate Director, Navy

**Director, Office of Quality and Compliance**

**Robert D. Foss, CAPT, DC, USN**

Chair, Department of Oral and Maxillofacial Pathology, CAPT Foss also serves as AFIP Associate Director, Navy. As Director, Quality and Compliance, he oversees Safety Management which monitors EPA and OSHA guidelines and Quality Assurance which is responsible for all quality assurance, risk management, credentialing and privileging activities at AFIP. The Oral and Maxillofacial Pathology Department deploys to Dover AFB to support the Armed Forces Medical Examiner with postmortem dental identification of service members.





## AFIP Leadership, including the Executive Committee



Clockwise around table from left:

**James L. Staiger, MD — Director of Administrative Services**

**Mike F. Nola, PhD — Director, Business Office**

**Catherine M. With, JD, LLM, LLM, Major, USA — Judge Advocate General's Corps; Legal Counsel**

**Adrianne Noe, PhD — Director, National Museum of Health and Medicine, AFIP**

**Sumitra Parekh, COL, MC, USA — Director of Advanced Pathology**

**Renata B. Greenspan, COL, MC, USA — The Director, AFIP**

**Florabel G. Mullick, MD, ScD, FCAP, SES — Principal Deputy Director**

**Robert D. Foss, CAPT, DC, USN — Associate Director, Navy; Director, Offices of Quality and Compliance**

**Charles W. Pemble III, Col, USAF, DC — Deputy Director, Air Force; Director of Field Operations**

**Christopher R. Owner, PhD — Director of Clinical Sciences**

## Director's Message



The year 2006 was one of momentous accomplishment for the Armed Forces Institute of Pathology (AFIP). Once again we reached our goal of being the premier pathology center in the world attributable to our intense dedication to pathology consultation, education, and research. We not only achieved our goals, we exceed them by advancing into new arenas that address and support the critical needs of a nation at war.

Aside from our world renowned staff of pathologists and scientists, our Repository remains our most venerated asset. Last year, the AFIP continued to modernize the tissue Repository, now consisting of over 7.1 million case files, and tissue specimens making them available for study internationally as well as support for the AFIP's digital fascicle library and the Tissue Microarray Program (TMA). TMA introduced the technology to create one slide containing 500 to 1,000 tiny cores taken from multiple tissue specimen blocks thereby allowing researchers to learn more about a given disease in less time. This technology and other services offered by the AFIP were made available globally utilizing our telepathology program. Version 2.1 of AskAFIP™ was instituted linking various knowledge bases and collections of case materials and authoritative resources published by the AFIP staff hence providing an innovative "just in time" educational experience to pathologists, radiologists, and other related specialists in both military and civilian medical communities. This updated version of AskAFIP™ encompasses the enhanced digital case repository, pathologic and radiologic imagery links to well known medical texts, and a continued medical education tracking model that is truly technologically advanced.

As the Global War on Terror continues, the AFIP is proving to be invaluable once again. We perform a vital role as our expert pathologists and scientists investigate environmental factors and organisms that cause specific illness, adverse reactions to medications and chemicals, and ecological threats and diseases that can affect our deployed troops and their continued health upon return to the United States. This is most crucial as bioterrorism and chemical warfare remain a threat to our nation. Additionally, the AFIP maintains the INTOX Data Center which consolidates all military correlated diseases discovered in military personnel. This database contains registries of case material addressing the medical conditions of certain groups of military personnel such as Former Prisoners of War, Veterans of Vietnam affected by Agent Orange, and those participating in the Global War on Terror. The Leishmania Registry is also included in this group. Leishmaniasis, an infection of the skin by protozoan parasites, is being diagnosed in increasing numbers of military and civilian personnel deployed to Iraq, Kuwait, and Afghanistan. Without the expertise of the AFIP staff, the cause and treatment of this infection would remain misunderstood and the welfare of our troops would be compromised.

The AFIP continues to research battlefield ballistic injuries and aid in the development of a new generation of body armor that will better protect our men and women on the battlefield. Additionally, we deployed many of our staff to Dover Port Mortuary where they accounted for those military members and civilians who have given the ultimate sacrifice in the service of our country.

I wish to convey my gratitude and appreciation to the pathologists, scientists, and support staff—both military and civilian—who comprise the AFIP staff, for their dedication, commitment, perseverance, and arduous work that lead to our success for the year 2006.

Renata B. Greenspan  
COL, MC, USA  
The Director

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**Principal Deputy Director**  
**Florabel G. Mullick, MD, ScD, FCAP, SES**



## AFIP Service Line Directors

Sumitra Parekh, COL, MC, USA  
Directorate of Advanced Pathology

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Directorate of Field Operations

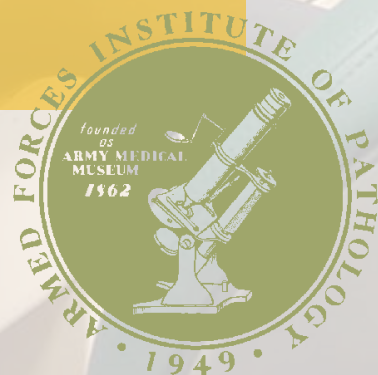
Christopher R. Owner, PhD  
Directorate of Clinical Sciences

Adrianne Noe, PhD  
Director, National Museum of Health and Medicine





**The Armed Forces Institute of Pathology supports the United States Department of Defense and serves the American people by providing medical expertise in diagnostic consultation, education, and research to enhance the health and well being of the nation.**





# 2006: AFIP at a Glance

## Consultation:

- Our diagnostic consultations served 51,265 patients in 2006.
- Consultations came from military (41%), VA (27%), civilian (21%) and other institutions (11%). Other institutions included Public Health Service, other Federal Agencies, and the programs for identification of human remains.
- Of the military institutions 48% were Army, 29% Air Force, and 23% Navy.
- For 71% of our consultations, our initial diagnosis or modification initiated or changed patient treatment.
- For 29% of our consultations, we confirmed the contributor's diagnosis.

## Education:

- In 2006, the AFIP and ARP offered 28 live courses, 24 Ground Rounds Video teleconferences, 26 Weekly Professional Staff conferences, 4 Web-based courses, and one Enduring Material Open File Legal Medicine update sent to 4,061 pathologists, clinicians, legal medicine professionals, and professionals in related disciplines.
- The AFIP awarded 108,953 credit hours of Continuing Medical Education.
- Education services were provided to 243 trainees within AFIP departments, 2805 attendees at long and short courses, 341 participants in Video Teleconferences, 245 recipients of the Histopathology Quality Assessment Program, 742 attendees at the AFIP Weekly Professional Conference and 12 Callender-Binford Fellows.

## Research:

- In 2006 we published 150 articles in journals, 104 abstracts, 28 book chapters, 8 books, 19 other publications and produced 14 books and fascicles for digital online availability.
- The year ended with a total of 182 active in-house projects, extramural grants, research contracts and agreements.







**“The road ahead will not be easy. This is a “new beginning” that I am confident with the help of everyone will help me maintain this institution as a National and International Central Institution for Excellence for as long as possible. I hope to have you all accompany me on this journey of a new beginning to wherever it ends.”**

**—Florabel G. Mullick, MD, ScD, SES**



Founded in 1862, the Armed Forces Institute of Pathology (AFIP) is a tri-service agency of the Department of Defense dedicated to pathology consultation, education, and research. The AFIP sustains 22 subspecialty departments and employs over 820 staff members both civilian and military including over 100 diagnostic pathologists and scientists. Historically the role of the AFIP has been dynamic, rising to meet such challenges as The Global War on Terror, the threat of global pandemic, and the information age of technology.

Because of the expertise and knowledge of the AFIP's staff of skilled pathologists and scientists, the AFIP remains an important organization. These pathologists and scientists

study medical cases that are difficult to diagnose because of their rarity. The accumulation of such cases has allowed the AFIP to develop and maintain its

## THE AFIP: A Unique Central Institution for Excellence



second most valuable asset, the Central Repository which consists of over 7.1 million case files and tissue specimens. The cases collected in the Repository continue to be the foundation for vital pathological studies and publications. During the past six years, the AFIP modernized and preserved the Repository by digitizing millions of images and case records making them available for study internationally. Additionally, the AFIP staff can access millions of online records from the largest virtual pathology collection in the world. Digitization of histopathologic cases creates "virtual" slides with unparalleled resolution. This technological advancement supports The AFIP's digital fascicle library and innovative research including the Tissue Microarray Program which permits a single glass slide to contain up to 1,000 tissue specimens. Furthermore, digital conversion of cases allows the AFIP staff to better provide diagnostic consultations and make available research methodologies and modernized online education.

The AFIP provides second opinion diagnostic consultations on pathologic specimens obtained from military, veteran, and civilian medical, dental, and veterinary sources. The AFIP's diagnostic departments include dermatological, hepatic, gastrointestinal, genitourinary, pulmonary, soft tissue, bone, hematological, neurological, endocrine, oral, veterinary, endocrine, and gynecological pathology. Specialty departments examining infectious and parasitic diseases, molecular techniques, and environmental pathology also provide crucial services. As all of these specialty departments are centrally located within one institution, rapid collaborative examinations of cases is facilitated, and interdepartmental collaborative research is the rule rather than the exception. More than 50,000 surgical and autopsy consultation requests were received from pathologists worldwide seeking the expertise of the AFIP staff. AFIP pathologists and scientists are also innovators in the development of programs in telepathology, gene studies, and imaging techniques serving as the standard within the pathology community.

The AFIP offers a vast amount of excellent educational opportunities to military and civilian pathologists, physicians, and various medical and scientific professionals. In 2006, the AFIP's Department of Medical Education awarded 108,953 Continuing Medical Education (CME) credit hours. The efficient and highly effective management of available knowledge allowed the AFIP to improve its distance learning program by employing the use of the updated 2.0 version of AskAFIP™ Web portal. This unique tool allows subscribing pathologists to accrue CME credits by reviewing materials offered by the AFIP. Additionally, the AFIP presents formal courses, including microscopic slide study sets, for postgraduate medical personnel participants seeking CME credits.

The AFIP is dedicated to scientific research and continually explores new possibilities and directions in fields such as environmental pathology and toxicology, geographic and infectious disease pathology, oncology, and forensic science. Every scientific research success by the AFIP can greatly affect military and civilians leading to a healthier and safer population. Scientific research at the AFIP is vital as it significantly impacts Homeland Security and the Global War on Terror.



## OAFME—Virtual Autopsy

The Virtual Autopsy program is used to support the teams at the Dover Port Mortuary in processing the remains of service members who died while serving the United States. Total-body scans are performed for the forensic evaluation of gunshot or blast wound victims. Virtual Autopsy technique uses state-of-the-art multidetector computed tomography (CT) and magnetic resonance imaging (MRI) postmortem, in conjunction with conventional autopsy findings, as a way of permanently archiving anatomic findings from ballistic and blast injuries at the time of death. Images are evaluated for lethal wounds, number and location of wound tracks, injured structures, and metal fragment location at a three-dimensional workstation. In order to improve survival in the combat environment, this data is available to current and future researchers into battlefield injury and fatality to improve personal protection systems and body armor currently in use on the battlefield.



## OAFME—Mortality Surveillance Division

Performs surveillance to monitor all active duty deaths, to quickly identify fatalities that require autopsy by AFMES, or could require a public health response, or those that could be the result of a bioterrorist act. Information is stored as collected in the Medical Mortality Registry for tracking. Data gathered has had significant impact on medical care and the design of personal protective equipment.





# AFIP: A Unique Institution

AFIP, although unique, collaborates seamlessly with specialty areas to accomplish the mission.

## The Armed Forces Medical Examiner System (AFMES)

The AFMES is responsible for multidisciplinary forensic investigations of atypical or violent deaths due to known or suspected accidents, homicide, suicide or undetermined means. The six divisions of the Medical Examiners System, Operations, Education and Research, Special Investigations, DNA, Toxicology, and Mortality Surveillance provide a full accounting for those who have made the ultimate sacrifice while serving the United States. In 2006, the department imparted expert diagnostic consultation services regarding an unprecedented 1,790 medical cases, and deployed its workforce in over 140 medicolegal missions. Included in these missions were deployments to Dover Air Force Base and The Dover Port Mortuary where remains of over 1,000 service members were investigated. These investigations establish positive identity and ascertain the actual cause and manner of death. Data gathered by AFMES medical examiners contribute to research on battlefield ballistic injuries and to the development of new-generation body armor that will protect troops in battle.

The AFMES also maintains the Department of Defense DNA Registry which is charged with the mission of DNA identification of human remains, information technology development, mass fatality management, and DNA reference specimen collection, archival, storage, and retrieval services for the DoD. Since 1994, the Armed Forces DNA Identification Lab has earned the distinction of being the global leader in employing mitochondrial DNA typing methods to identify the remains of unknown service members from all American armed conflicts.

The AFMES Division of Forensic Toxicology provides toxicological services for the AFMES and investigates all Armed Forces air, ground, and sea mishaps, criminal investigations, fitness for duty investigations, and medicolegal determinations. The staff provided toxicological consults to NASA following the Space Shuttle Columbia accident investigation, the Central Intelligence Agency, and hundreds of military and federal agencies during Operation Enduring Freedom and Operation Iraqi Freedom.

## The National Museum of Health and Medicine

The NMHM, a division of the AFIP, heralds the practice of medicine, with an emphasis placed upon American military medicine, spanning the era of the Civil War to the present day era. Anatomical and pathological specimens, over 12,000 medical instruments, more than 5,000 skeletal specimens and 10,000 preserved organs documenting medical cases of disease and injury, the largest collection of embryologic material in the United States and microscope slide-based medical research collections can all be found within the NMHM. The museum identifies, collects, and preserves vital resources to achieve a broad agenda of innovative exhibitions, scientific and historical medical investigations, and educational programs. The Museum, through its focus on critical public and military health issues, emphasizes its importance as a bridge between biomedicine and the general public.

## Genitourinary Pathology and Nephropathology

The department maintains registries at the AFIP which greatly contribute to molecular pathology. Its vast repository of typical and unusual diseases includes the congressionally mandated tri-service prostate specimen repository recognized as the Center for Prostate Disease Research. The staff is frequently requested to provide personal consultations to members of Congress, on military personnel and civilian medical cases. Research done by the department has greatly impacted the diagnosis and treatment of prostate cancer and aids in ensuring the health and well-being of men globally. The staff is also renowned as the World Health Organization Collaboration Center for Histological Classification of



## Unique Registries at AFIP

The Department of Environmental and Infectious Disease Sciences maintains war-related datacenter Registries of anatomic pathology material from former POWs dating back to 1945, Vietnam War/Agent Orange veterans, Kuwait/Persian Gulf War veterans. Three additional registries are related to the Global War on Terrorism—Leishmaniasis, a disease-specific registry to monitor leishmaniasis cases from Southwest Asia, the Afghanistan Service Registry for military personnel deployed there, and the Operation Iraqi Freedom Registry. All registries are being consolidated into the International Toxicology Data Center making over 19,000 reports instantly retrievable.

Other registries in the department are the Breast Explant Registry database to archive and study data on silicone breast explants and bioimplantable materials, the Depleted Uranium Registry to analyze and monitor uranium exposure within all the armed services, the International Tissue and Tumor Repository for Chronic Arseniasis Registry, the Registry on Military Medical Geology to study and characterize geological and environmental factors and their distribution on the development of health problems, Tissue Reaction to Drugs, and the Registry on Chemical Warfare Agents.

The registries collaborate with the NCI, DoD, national and international organizations including the VA, UNESCO, the US Geological Survey, the Navy Bureau for Medicine, and the Army Corps of Engineers Environmental Lab.



## Telepathology Advances at AFIP in 2006

In 2006, AFIP personnel installed a cutting edge digital slide scanner at the 10<sup>th</sup> Command Support Hospital in the International Zone in Baghdad, Iraq. Slide scanners create a two-dimensional virtual copy of a glass slide which then can be transmitted electronically back to the AFIP for diagnosis. In this fashion, pathology diagnosis can be rendered by AFIP experts in hours rather than days, making a major impact on lives of wounded soldiers, and impacting on difficult cases around the globe in real time.

Currently, the AFIP and DoD telemedicine has similar systems in 11 laboratories around the world, with three more installations planned in 2007. The AFIP telepathology program is the largest of its type in the world, and the addition of digital slide scanners resulted in an overall doubling of cases from Army laboratories in 2006. Another effect of installing digital scanners is the additional mission of remote quality assurance, which the AFIP can assist with ongoing quality assurance at Army pathology labs internationally.





### Tumors of Urinary Tract and Male Sex Organs.

The Nephropathology division staff consults on medical cases involving difficult kidney tumors and serve as the primary pathologists in most cases, performing light immunofluorescence and electron microscopy insuring authoritative and superior diagnoses. As the number of cases involving prostate tumors, kidney tumors, and bladder tumors found in young patients continue to rise, the expertise of the department is critical in obtaining an unequivocal diagnosis, and effective life saving treatment.

### Gynecologic and Breast Pathology

The Department of Gynecologic and Breast Pathology is vital to the health and vigor of women worldwide. With the ever-increasing role of women in the military, monitoring and promoting women's health has become a matter of military preparedness and a vital concern worldwide. Early detection of breast cancer allows for the most effective and life saving treatment available. Research ventures including studies of mesenchymal lesions of the uterine cervix, various lesions and tumors of the breast, and ovarian tumors have enabled the department to remain the paragon of women's healthcare.

### Neuropathology

Whether it is for diagnostic consultations, educational lectures, or providing expert testimony at military court martial cases, the knowledge and proficiency of the staff comprising the Department of Neuropathology and Ophthalmic Pathology is in constant demand. The department maintains the only military services program fully accredited by the Accreditation Council for Graduate Medical Education in neuropathology. Cases submitted to the staff for consultation and diagnosis include surgical specimens, whole brains obtained at autopsy, skeletal muscle biopsy specimens for cases of medical disorders of skeletal muscle, peripheral nerve biopsy specimens, and skin biopsy specimens from suspected cases of storage disease.

Members of the staff shared their expert skills and extensive knowledge with the ongoing NASA investigation of the space shuttle Columbia disaster and provided neuropathology reviews on selected cases from the Office of the Armed Forces Medical Examiners. The Ophthalmic Pathology staff also provides consultation to case contributors concerning disease and tumors of the eye and conducts research based on the wealth of accumulated case material cataloged in the Registry of Ophthalmic Pathology.

### Dermatopathology

The Department of Dermatopathology offers authoritative consultations for military, federal, and civilian institutions on the largest number of cases of any department in the AFIP. In 2006, the department consulted on 9,060 cases, many times changing the contributor's initial diagnosis from a benign skin lesion to a cancerous condition or from malignant to benign. This significantly altered medical treatment offered to patients and potentially conserved millions of dollars in medical malpractice law suits.

Furthermore, our staff provides extensive training to many rotating medical residents, both military and civilian, in the field of dermatopathology. The department's Dermatopathology Fellowship Training Program is the only program in the DoD that provides training for military physicians leading to board certification in dermatopathology.



## IMC Imaging

Over 23 million images of specimens in the world's largest tissue repository of usual and unique disease tissues, as well as the DoD Tumor Registry program, radiologic pathology collections, Museum collections, and unaccessioned tissue from BRAC bases are now retrievable for research, commercial, and academic entities. The IMC records management and imaging staff have scanned and organized various collections of specimens into databases of virtual slides. This database will be an extraordinary source for research into evolving diseases and military health management. There is also a pilot exercise to image microfiche medical records prior to 1978.

The IMC contract will also continue development of the AskAFIP™ portal and support in the creation of tissue microarrays. Hosting of 3TB (Terabytes) of AFIP converted images and AskAFIP™ data is on a secure DoD owned, contractor-operated facility at the NAVSEA Allegheny Ballistic Labs in Rocket Center, WV.

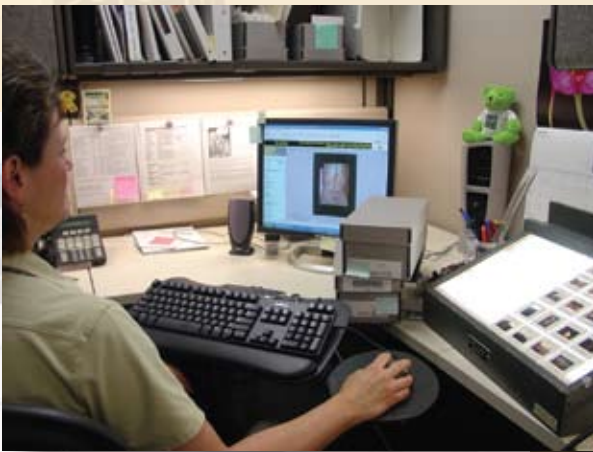


## Tissue Microarrays

The Tissue Microarray Core Laboratory was organized in 2006 and provides state-of-the-art tissue array support of research activities. TMAs make the most effective and efficient use of the unique repository tissue available by consolidating hundreds of tissue punches of similar tissues on one slide rather than the conventional one slide/one tissue specimen/1 patient glass slide.

This program makes the repository accessible to public health and military medicine in a controlled fashion without compromising the rare and common tissue samples by leaving most of the original paraffin tissue block untouched.

Three TMAs of gynecologic disease specimens that provide validation data for genomics are available as well as a neuropathology TMA of low and high grade glial tumors to assess Wilms' tumor (WT1) expression in CNS glial neoplasm. WT1 protein has been considered as a new molecular target of cancer immunotherapy for several solid tumors. TMAs for colon, breast, and prostate cancer, cardiovascular disease and diabetes are planned.





### **Soft Tissue and Orthopedic Pathology**

The Department of Soft Tissue and Orthopedic Pathology analyzes the world's largest collection of gastrointestinal stromal and smooth muscle tumors and generates systemic data on the behavior of tumors. Tumors with a wide variety of histogenesis, including examples of inflammatory, degenerative, post traumatic, and iatrogenic conditions, are examined and analyzed by the department's highly skilled pathologists. Departmental pathologists provided consultation on 4,268 medical cases in 2006, imparting authoritative diagnosis preceding appropriate medical treatment.

### **Oral and Maxillofacial Pathology**

The department performs consultative services for the US Army, Navy, and Air Force medical treatment facilities, Veteran Affairs medical centers, and for the United States

Public Health Services, as well as civilian medical facilities worldwide. The staff supports and augments the Office of the Armed Forces Medical Examiner by imparting knowledge and expertise concerning forensic dental identification, and has worked on a number of mass disasters in support of Operation Iraqi Freedom. In 2006, over 1,000 postmortem dental examinations were performed at Carson Mortuary at Dover Air Force Base including active duty casualties of military personnel, civilian deaths within the war theater, Iraqi enemy prisoners of war deaths, and other military related deaths worldwide. Rapid and accurate dental identification within hours of a postmortem examination allows service men and women who have made the ultimate sacrifice serving their country, an expedient return to their loved ones so they can be laid to rest with honor.

Members of the staff can be ready to deploy within four hours of notification and were deployed to 24 military commands, establishing off-site forensic dental identification training laboratories and insuring preparedness for future mass casualty disasters.

### **Hematopathology**

The Department of Hematopathology makes available to the DoD, Veteran Affairs medical centers, and intercontinental civilian hospitals, expert consultation in medical cases including diseases and tumors of the hematopoietic system, the lymph nodes, spleen, and bone marrow. Comprehensive consultation is often implemented by the staff in conjunction with other AFIP departments and through use of ultramodern technology to make the most definitive diagnosis possible. The department provides the only accredited hematopathology training program in the 3 branches of the military providing training for the subsequent staffing of the military hospitals.

### **Endocrine and Otorhinolaryngic/Head-Neck Pathology**

The department staff offers expert expertise on a broad spectrum of pathologic conditions consisting of a multitude of disease entities affecting the upper respiratory tract, ear, and adjacent or unrelated anatomic areas of the head and neck, and the diseases of the pancreas, adrenal, thyroid, and parathyroid glands. Many of the cases received by the department staff are difficult or controversial histopathologic diagnostic cases from US military medical commands or facilities, VA medical centers, US Public Health centers, and civilian hospitals in the United States and abroad. The majority of cases are active surgical pathology cases with patient treatment decisions awaiting consultative diagnostic evaluation. In 2006, the staff consulted on 2,552 cases with approximately 30% of consultation cases resulting in a change of diagnosis, many with a significant and sometimes crucial effect on patient treatment decisions.

### **Veterinary Pathology**

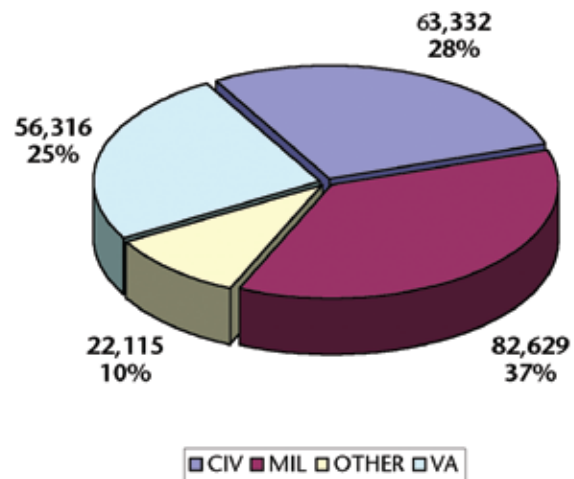
The Department of Veterinary Pathology plays an integral role in DoD's biomedical research efforts that provide protection to service members engaged in battle. The skilled staff is trained to detect and recognize foreign animal diseases, many of which are potential biological weapons. It is vital to maintain disease surveillance measures in military communities with the increased threat of bioterrorism since all of the known potential biological weapons, with the exception of Smallpox, are zoonotic diseases. Staff veterinary pathologists provide essential diagnostic pathology services for the DoD's



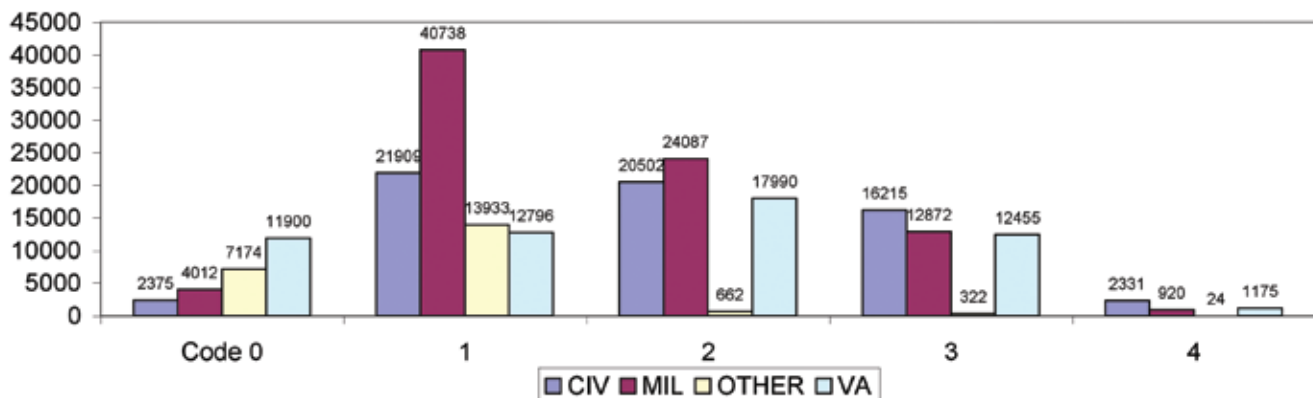
## Civilian Consultation

AFIP continues to play an important role in the civilian second-opinion pathology consultation needs of the pathology community. All diagnostic reports are maintained in the Pathology Information Management System (PIMS) for rapid retrieval and review by staff and contributing pathologists.

### Finalized PIMS Cases - 2003 - 2006



### Finalized PIMS Cases by Agreement Code - 2003 - 2006



Agreement codes:

- 0=No diagnosis rendered by AFIP
- 1=No diagnosis rendered by contributor
- 2=Agree with contributor's diagnosis
- 3=Minor change in diagnosis
- 4=Major change in diagnosis effecting patient outcome





military working-dog programs and other federal working-animal programs, including the Navy Marine Mammal Program and those conducted by the Customs Service, Border Patrol, and Secret Service.

Unfortunately, there remains a worldwide shortage of veterinary pathologists; however, the Veterinary Pathologist Residency Program at the AFIP continues to be a cost effective source of trained pathologists for all of the Department of Defense research, investigative, and pathology needs. The department continued to expand the Veterinary Systematic Pathology Online Program with the assistance of a Department of Education grant and in collaboration with four universities.

## **Environmental & Infectious Disease Sciences**

The Department of Environmental and Infectious Disease Sciences is a multifaceted department performing numerous services that are imperative to the health and well being of humankind.

Comprised of the only group of pathologists in the world dedicated to the pathology of infectious disease, this department conducts consultation and implements research initiatives concentrating on diseases affecting the global community. In 2006 alone, the department staff reviewed and more than 7,000 medical cases. The department analyzes environmental factors that negatively impact the human body as well as organisms that can induce specific life-threatening illnesses. Threats and diseases affecting the nation's deployed troops are highly scrutinized and researched. The department continues to accomplish its goal of protecting the health and welfare of our nation's armed service personnel which is essential as the Global War on Terror continues and the threat of bioterrorism continues.

The department maintains the INTOX Data Center which consolidates cases of all correlated diseases discovered in military personnel such as Former Prisoners of War, Veterans of Vietnam affected by Agent Orange, and those participating in the Global War on Terror. Also included in this group is the Leishmania Registry. Leishmaniasis, an infection of the skin by protozoan parasites, is being diagnosed in increasing numbers of military and civilian personnel deployed to Iraq, Kuwait, and Afghanistan. The comprehensive collection allows staff pathologists to research these conditions, facilitate authoritative diagnosis, and make possible appropriate medical treatment for those affected by military-related illness and disease.

The staff pathologists and scientists continue to provide analytical support maintaining the AFIP's Depleted Uranium Registry. A specimen management system for the registry was implemented and at present, consists of over 2,545 archived samples from the Depleted Uranium Surveillances Program. In 2006, the department provided support and information on varied topics related to depleted uranium, including measurement techniques, environmental monitoring, solidier biomonitoring, epidemiology, and histopathologic evaluations. The department's laboratory on Depleted Uranium analysis provided analytical support to many groups including, Walter Reed Army Medical Center Physics and Preventative Medicine Programs and the Department of Defense Force Health Protection and Readiness Program.

The department maintains the Breast Explant Registry and conducts a research program on the archiving, consultation, and biophysical studies of silicone breast explants and bioplatable materials database for the best possible healthcare for women.

Furthermore, the department staff developed the world's largest repository of the pathology of HIV infection and AIDS, including material from original cases reported to the Center for Disease Control. Staff pathologists offer medical expertise in HIV-related and emerging infections in diagnostic consultation, education, and research.

The Department of Environmental and Infectious Disease Sciences is home to one of nation's foremost biodefense labs providing broad spectrum microbial/biothreat research, testing, and consultation for the federal government. It grows and preserves strains of biothreat agents and prepares and provides the highest quality DNA/RNA for assay development and validation. The department lab conducts proficiency testing for biological agent detection systems and is a part of the National Laboratory Response Network, performing advanced confirmation diagnoses of suspected infections as





## National Museum of Health and Medicine Satava Collection

The National Museum of Health and Medicine of the Armed Forces Institute of Pathology expanded the exhibition of items in its COL Richard M. Satava, MD FACS Advanced Medical Technologies Collection.

Initiated to document the leading edge of medical technology and the application of advanced computational capabilities to medicine, the Satava collection assembles architectural elements for the next generations of military and civilian medicine. Originally comprising objects relating to the work of Satava Prize-winning scientists, technologists, and clinicians, the collection has expanded to include other contemporary items remarkable for their current capabilities, valuable for their military medical and historical importance, and rich in the research potential they offer scholars and biomedical researchers.

Displayed items include the Penelope Surgical Instrument Server, the world's first autonomous, intelligent, computer-vision guided surgical assistant robot conceived, designed, and built at Robotic Surgical Tech, Inc., a team of designers and engineers led by Michael Treat, MD, and the Life Support Trauma and Transport Unit, developed under US military auspices as a portable intensive care unit with advanced monitoring, care-delivery, and record keeping capabilities.



## Medical Education

Seeing a large volume of unusual consultation cases and having the resources of a vast repository of normal and special specimens places AFIP in a unique position to offer advanced medical education courses. Many formats including lecture courses, slide sessions, Web-based AskAFIP™, virtual slides, and audio and video teleconferences allow a wide range of attendees to stay up to date with diagnostic criteria and techniques, and to earn CME credits. VA and other pathologists are also able to maintain professional certification without exhausting travel budgets by accessing VTC courses. Special Hot Topics, information on diseases of public health importance such as SARS and anthrax, are available through AskAFIP™ 24 hours a day.





well as environmental testing for bio-threat agents. By employing infrared and Raman spectroscopy and scanning electron microscopy with dispersive x-ray analysis, it is now possible to identify white powders suspected of being biological agents.

### **Hepatic and Gastrointestinal Pathology**

The Department of Hepatic and Gastrointestinal Pathology has provided consultative service in 5,150 medical cases and continues to provide incisive services. Most cases submitted to the department are those that have posed diagnostic problems for the contributor, particularly those associated with the liver such as chronic cholestatic disorders and steatohepatitis; and the gastrointestinal tract including neoplastic and precancerous lesions, as well as inflammatory disease, carcinoids, gastrointestinal tumors, lymphomas, appendiceal mucinous tumors, and surveillance biopsies in cases of ulcerative colitis and Barrett esophagus. The department continued its tradition of excellence by training military pathologists and gastroenterologists amassing a total of 1,231 training days. The department enjoyed the continued success of the highly acclaimed Annual Course on Endoscopic GI Tract Biopsies, The Virtual Gastrointestinal Endoscopic Biopsy Course, as well as the annual Hepatic Pathology Course.

### **Pulmonary and Mediastinal Pathology**

The department is considered one of world's foremost authorities on thoracic pathology. The staff offers authoritative and skilled consultation on medical cases that are difficult to diagnose and are indicative of rare diseases involving pulmonary, pleural, and mediastinal pathology. Pathologists working in the department collaborate with expert thoracic radiologists and pulmonologists at the AFIP ensuring the most informed consultation possible.

The department was integral in the diagnosis of acute eosinophilic pneumonia cases that were part of a cluster of cases of severe respiratory illness observed in active duty military personnel serving in Afghanistan and Iraq. In turn, this diagnosis led to the development of the AFIP Hot Topic on acute eosinophilic pneumonia which then was disseminated on the Web giving instant access to updated information to military physicians in the Southwest Asian and Middle East war theater on diagnosis of this type of pneumonia.

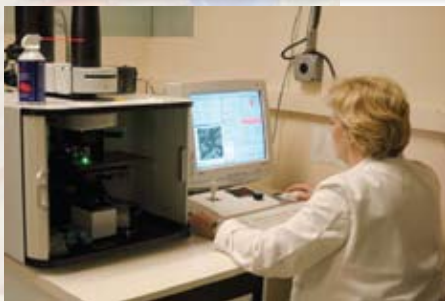
### **Radiologic Pathology**

The staff of the Department of Radiologic Pathology significantly contributes to the education of both military and civilian radiology residents, using radiologic-pathologic correlation and a variety of military activities affiliated with the AFIP. Held 5 times a year, the department hosts the world renowned Radiologic-Pathologic Correlation Course. In 2006 alone, 1,255 radiology residents attended the course. The course is fully subscribed almost two years in advance and is attended by virtually all civilian and military residents from the 190 United States residency programs. This course has provided the department with 1,271 new cases in addition to the over 94,000 cases catalogued in the departments unique repository. This repository is the basis for all research, articles, and lecture series sponsored by the department.

In 2006, the RadPath Luminary, a quarterly electronic newsletter, was sent to more than 18,000 email addresses of radiologists and physicians worldwide. The department also maintains and updates the online educational portal, Radiologic Pathology at Ask AFIP, combining all case material, the 2005-2007 Radiologic Pathology course syllabus, and scientific articles into an interactive platform that allows the efficient and timely review of a variety of topics in addition to a means of self assessment for the user.

### **Department of Scientific Laboratories**

The Department of Scientific Laboratories' crowning achievement and one of the AFIP's most valuable assets is the Tissue Microarray (TMA) program and, in 2006, the TMA core laboratory at the AFIP was organized. TMA provides a modern methodology for the microscopic examination and assessment of tissue specimens. Traditional means of tissue based research is limited because one slide represents one disease specimen taken from a





## Prostate Studies The Center for Prostate Disease Research—CPDR

Established by Congress in 1991, a multidisciplinary program in conjunction with Walter Reed Army Medical Center, Uniformed Services University of the Health Sciences, and DoD medical centers. AFIP serves as a tri-service biological specimen repository for laboratory consultation, diagnosis of typical and unusual tissue, and as a vast base of specimens for tissue microarrays.

## Veterans Affairs

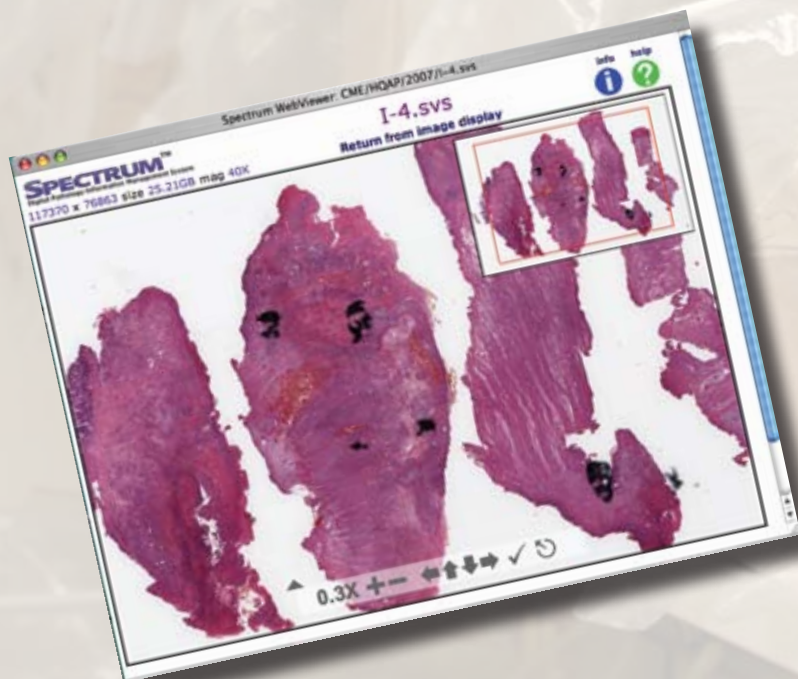
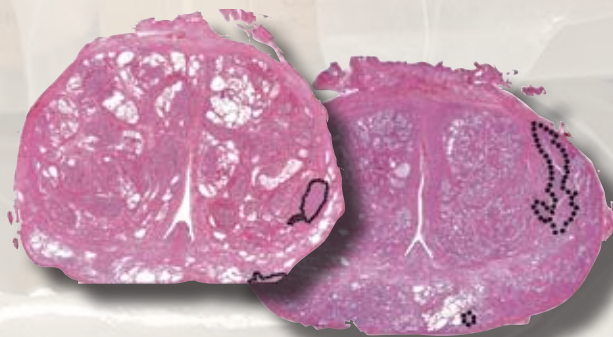
AFIP plays a critical and historical role in supporting the Department of Veterans Affairs, an extensive role in supporting American veterans.

AFIP serves as a reference laboratory for the VA and provided over 10,770 consultations in 2006. AFIP also serves as an external quality assurance reviewer for the VA and each VA facility providing surgical diagnoses participates in the Systematic External Review of Surgicals (SERS). AFIP conducts quality assurance on virtual slides of specific cases each quarter in the Histopathology Quality Assessment Program.

AFIP sponsors research protocols in coordination with the VA, giving researchers access to the vast repository of specimens and expertise available at AFIP.

The VA collaborates with the AFIP in the war-related Registries—Agent Orange, Kuwait, Gulf wars, Iraqi Freedom—to monitor and support active/retired military and to follow their medical conditions.

455 VA staff attended AFIP sponsored VTC, live, and internet advanced medical education courses.





single patient and can only be viewed from one site. However, TMA allows a single slide to retain thousands of tiny core samples from tissue blocks from one or many patients. The innovative techniques offered by TMA enable pathologists to rapidly gain more knowledge about specific diseases while making the process of mounting, staining, and storage of tissue specimens much more efficient. Employing the AFIP's internationally acclaimed largest collection of tissue specimens, pathologists and scientists at the AFIP were able to create a multitude of slides for inclusion in the TMA program. The TMA program greatly impacts the study of pathology and propels the AFIP into the foreground of research and biotechnology.



The Department of Scientific Laboratories is home to the Tri-Service School of Histopathology. This school is the only military school of its kind providing basic and advanced training in histology techniques.

### **Department of Telemedicine**

The Department of Telemedicine offers and maintains the largest electronic consultation program in the world. The AFIP's telepathology program is the first of its kind to offer the innovative and technologically advanced technique which uses virtual slide scanning as a diagnostic tool. Slides can now be scanned at remote sites such as the 10th Command Support Hospital in Baghdad, the Army's 12 busiest pathology labs, and other facilities spanning the globe, and then sent to AFIP pathologists who are able to render virtual real-time diagnosis making life-saving treatment more expedient.



AskAFIP™ version 2.1 was debuted in 2006. This version provides real-time educational experiences to pathologists, radiologists, and related specialists in both military and civilian medical communities worldwide. Version 2.1 includes the improved digital case repository, in which AFIP subject matter experts combine brief synopses of important disease entities, a wide range of pathologic and radiologic imagery, links to PubMed articles and well known medical texts, as well as a wholly unique Continuing Medical Education (CME) tracking model that accounts for all CME hours awarded by the AFIP.

### **Department of Biophysics**

The scientists and staff comprising the Department of Biophysics fulfill a service that is critical to the protection and well being of humankind. The department's research impacts the protection of our service men and women in harms way and our nation's homeland as we continue to fight the Global war on Terror. The Department of Biophysics develops highly sensitive and specific assays for detecting biological toxins in the field, including cholera and outline toxins, provides forensic analysis of terrorist incidents, and continues to apply innovative techniques to the study of traumatic bone injury which will have an immediate impact on the treatment and rehabilitation of our injured soldiers. The staff uses Magnetic Resonance Microscopy (MRM) to develop and evaluate tissue engineered bone implants for reconstructive bone surgery and to evaluate bone disease. MRM is employed as a non-invasive high resolution imaging modality to assess bone repair, cartilage growth, develop tissue engineered bone implants for reconstructive surgery, and compare the effectiveness of these implants with traditional bone grafts. MRM is key technology in studies having the goal of understanding hearing loss in traumatic ear injuries, optimizing the development and placement of cochlear implants, restoring auditory function, and in forensic wound pattern analysis in the eyes and on the skin.

### **Department of Medical Education**

Education is a cornerstone of the AFIP and the Department of Medical Education builds upon this foundation by offering educational opportunities through Continuing Medical Education (CME) in pathology, radiology, and other medical disciplines by providing specialized information, advanced research and technology in the study of the pathophysiology of disease. The department backs the goals of both the AFIP and the American Registry of Pathology (ARP) by implementing educational activities in partnership with governmental, academic, and private sector organizations.

The courses offered by the department encompass the subspecialties of pathology

including dentistry, veterinary, forensic, and environmental medicine. The material addressed at these courses is derived from more than 55,000 cases received annually by the AFIP. Many of these cases are difficult diagnostic cases making them consummate resources for educational endeavors.

### **Department of Repository and Research Services**

The Department of Repository and Research Services maintains the AFIP repository, consisting of over 7.1 million case files and associated paraffin blocks, microscopic glass slides, and formalin-fixed tissue specimens. The department insures that case materials are received and accessioned with the utmost accountability. This includes responding to outside requests for release of medical information and pathologic materials that must be in keeping with the guidelines set forth by the Health Insurance Portability and Accountability Act (HIPAA). The department also provides initial and refresher training to the entire AFIP staff in regards to HIPAA laws. Periodic quality assurance audits are conducted by the Department of Repository and Research Services to ensure case record completeness, the integrity of the research database, and the accurate tracking of case materials, as well as coordinating administrative requirements for research protocols including review, approval, and monitoring of research activities by our Institutional Review Board, Institutional Animal Care and Use Committee, and Research Committee.





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Case Accessions — 202-782-1630

Medical Information Release — 202-782-2424

Public Affairs — 202-782-2115

American Registry of Pathology — 202-782-2102

Military Personnel — 202-782-2526

National Museum of Health and Medicine — 202-782-2200

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